

ANNUAL REPORTBACK 2021

THE UNESCO UNISA
iThemba LABS-NRF
Africa Chair in Nanosciences
and Nanotechnology
(U2ACN2)

JANUARY - DECEMBER 2021



Define tomorrow.



Personal information of the project leader

Title:	Professor
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From left at the back: Ms Zerfie Mihabaw (MSc postgraduate student); Dr Nandipha Botha; Mr Henok Gebretinsae (PhD Fellow); Mr Adama Fall (PhD fellow); Mr Meresa Tsegay (PhD fellow) Dr Chester Kotsedi.

From Left in front: Dr Nolubabalo Matinise; Mrs Rashidah Akoba (PhD fellow); Dr Juliet Sackey; Ms Phumza Zantsi (iThemba Labs secretary); Prof. M. Maaza; Dr Itani Madiba; Mr Daniel Kpeglo (PhD fellow); Dr Karen Cloete.



The research project

UNESCO-UNISA-ITLABS/NRF Africa Chair in Nanosciences and Nanotechnologies (U2ACN2)

The UNESCO UNISA ITLABS/NRF Africa Chair in Nanosciences & Nanotechnologies has impacted and is impacting significantly at various levels:

- Chairing and facilitating the weekly and monthly virtual e-meetings of the Chair
- Supervision of 37 PhD/MSc students both physical or virtually
- Mentorship of five postdocs and six emerging scientists
- Conducting research while in the laboratory during low levels of the pandemic
- Application for external funding
- Initiating and implementing international partnerships
- Thesis corrections and peer reviewing.
- Participation in international and national conferences
- Participation in Covid-related initiatives
- Delivering webinars – nationally, continentally and internationally
- Active participation in various Academies within which I am affiliated as full member
- Active participation in various institutional duties towards the School (SIRGS) and the College (CGS) where the Chair is headquartered
- Peer reviewing NRF AAS applications
- Peer reviewing for various journals from various publishing houses
- Assisting postdocs and emerging scientists with writing successful funding applications

The UNESCO UNISA ITLABS/NRF Africa Chair in Nanosciences & Nanotechnologies achieved the following milestones during the 12 months of 2021 (Jan 2021-Dec 2021):

- Excellence: Two Chair Members been ranked among the top 2% highly cited scientists in the world by Clarivate & Stanford University Metrics
- HCD: Graduation of 4 PhD students
- HCD: Graduation of 3 MSc students
- HCD: Finalized 5 PhD dissertations submitted for external peer review
- HCD: Finalized 2 MSc dissertations to be submitted by end July 2022 for external peer review
- HCD: Enrolment of 7 new postgraduates
- HCD: Supervision of 37 PhD/MSc students 5 postdocs & 6 emerging scientists
- R&D: Publication of 87 ISI-SCI DHET approved publications in international peer reviewed journals
- R&D: Publication of 46 ISI-SCI DHET approved Proceeding publications in international peer reviewed journals
- R&D: Publication of 2 book chapters
- Internationalization: Finalization of 2 MoUs with international institutions
- Internationalization: Initiation of 10 new continental & international partnerships
- Internationalization: Initiation of 1 strategic multilateral partnership
- Internationalization: presentation of 36 international /national Webinars
- Internationalization: Initiation of 10 new continental & international partnerships
- Fundraising of R 3,780,000.00 from external sources
- Total citations: 4492, Hindex= 78, i10index= 33
- R&D translations: 2 international patents through the Innovation, Technology Transfer and Commercialisation Department
- Initiation & implementation of an Open Access Journal: NANO-HORIZONS, in partnership with UNISA Publishing & Open Access International-Germany
- 2 NRF rated emerging scientists at the level of Y2 & C2

Research outputs

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
1	Accredited Journals (ISI, IBSS or DHET Journals)	Industrial dye removal using biosynthesized Agdoped ZnO nanoparticles	<ul style="list-style-type: none"> ● Online ● Published 	Environmental Nanotechnology, Monitoring and Management 16,100463 (2021)	Noukelag, S.K., Razanamahandry, L.C., Ntwampe, S.K.O., Arendse, C.J., Maaza, M.
2	Accredited Journals (ISI, IBSS or DHET Journals)	Isolation and characterization of chitosan from Ugandan edible mushrooms, Nile perch scales and banana weevils for biomedical applications	<ul style="list-style-type: none"> ● Online ● Published 	Scientific Reports 11(1), 4116(2021)	Ssekatawa, K., Byarugaba, D.K., Wampande, E.M., (...), Ejobi, F., Kirabira, J.B.
3	Accredited Journals (ISI, IBSS or DHET Journals)	First principle simulation of coated hydroxychloroquine on Ag, Au and Pt nanoparticles	<ul style="list-style-type: none"> ● Online ● Published 	Scientific Reports 11(1), 2131(2021)	Morad, R., Akbari, M., Rezaee, P., (...), Maaza, M., Jamshidi, Z.
4	Accredited Journals (ISI, IBSS or DHET Journals)	CdO/CdCO ₃ nanocomposite physical properties and cytotoxicity against selected breast cancer cell lines	<ul style="list-style-type: none"> ● Online ● Published 	Scientific Reports 11(1), 30(2021)	Lefojane, R.P., Sone, B.T., Matinise, N., (...), Maaza, M., Sekhoacha, M.P.
5	Accredited Journals (ISI, IBSS or DHET Journals)	Degradation of Codeine Phosphate by simultaneous usage of eaq ⁻ and OH radicals in photo redox processes: Influencing factors, energy consumption, kinetics, intermediate products and degradation pathways	<ul style="list-style-type: none"> ● Online ● Published 	Optik 243, 167415(2021)	Azizi, S., Sarkhosh, M., Najafpoor, A.A., (...), Maaza, M., Sadani, M.
6	Accredited Journals (ISI, IBSS or DHET Journals)	Studies on the spectrometric analysis of metallic silver nanoparticles (Ag NPs) using Basella alba leaf for the antibacterial activities	<ul style="list-style-type: none"> ● Online ● Published 	Environmental Research 199, 111274(2021)	Mani, M., Pavithra, S., Mohanraj, K., (...), Maaza, M., Kaviyarasu, K.
7	Accredited Journals (ISI, IBSS or DHET Journals)	Reparation and characterization of Fe doped nhydroxyapatite for biomedical application	<ul style="list-style-type: none"> ● Online ● Published 	Surfaces and Interfaces 25, 101185(2021)	Jose, S., Senthilkumar, M., Elayaraja, K., (...), Maaza, M., Kaviyarasu, K.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
8	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis and characterization of Sn-doped TiO ₂ film for antibacterial applications	<ul style="list-style-type: none"> ● Online ● Published 	Applied Physics A: Materials Science and Processing 127(7), 498(2021)	Rajeswari, R., Venugopal, D., George, A., (...), Maaza, M., Kaviyarasu, K.
9	Accredited Journals (ISI, IBSS or DHET Journals)	Impedance studies of biosynthesized Na _{0.8} Ni _{0.33} Co _{0.33} Mn _{0.33} O ₂ applied in an aqueous sodium ion battery	<ul style="list-style-type: none"> ● Online ● Published 	International Journal of Energy Research 45(7), pp. 11123-11134 (2021)	Nwanya, A.C., Ndipingwi, M.M., Anthony, O., (...), Maaza, M., Iwuoha, E.I.
10	Accredited Journals (ISI, IBSS or DHET Journals)	Dry Gongronema latifolium aqueous extract mediated silver nanoparticles by one-step in-situ biosynthesis for antibacterial activities	<ul style="list-style-type: none"> ● Online ● Published 	Surfaces and Interfaces 24, 101116(2021)	Aisida, S.O., Ugwu, K., Nwanya, A.C., (...), Maaza, M., Ezema, F.I.
11	Accredited Journals (ISI, IBSS or DHET Journals)	Morphological study of nanostructures induced by direct femtosecond laser ablation on diamond	<ul style="list-style-type: none"> ● Online ● Published 	Micromachines 12(5), 583(2021)	Abdelmalek, A., Giakoumaki, A.N., Bharadwaj, V., (...), Eaton, S.M., Maaza, M.
12	Accredited Journals (ISI, IBSS or DHET Journals)	Green synthesis of single phase hausmannite Mn ₃ O ₄ nanoparticles via Aspalathus linearis natural extract	<ul style="list-style-type: none"> ● Online ● Published 	SN Applied Sciences 3(5), 562(2021)	Diallo, A., Tandjigora, N., Ndiaye, S., (...), Ahmad, I., Maaza, M.
13	Accredited Journals (ISI, IBSS or DHET Journals)	Effects of copper ion irradiation on Cu _y Zn _{1-2y-x} Mn _y / GO supercapacitive electrodes	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Applied Electrochemistry 51(5), pp. 829-845 (2021)	Obodo, R.M., Chibueze, T.C., Ahmad, I., (...), Maaza, M., Ezema, F.I.

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14	Accredited Journals (ISI, IBSS or DHET Journals)	Impact of particle size and surface defects on antibacterial and photocatalytic activities of undoped and Mgdoped ZnO nanoparticles, biosynthesized using one-step simple process	<ul style="list-style-type: none"> ● Online ● Published 	Vacuum 187, 110110 (2021)	Okeke, I.S., Agwu, K.K., Ubachukwu, A.A., (...), Whyte, G.M., Ezema, F.I.
15	Accredited Journals (ISI, IBSS or DHET Journals)	A nanotechnology foresight perspective of South Africa	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Nanoparticle Research 23(4), 92(2021)	Masara, B., van der Poll, J.A., Maaza, M.
16	Accredited Journals (ISI, IBSS or DHET Journals)	The "Nanotechnology Innovation Diamond", a model for successful nanoscience research and development	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Nanoparticle Research 23(3), 60 (2021)	Masara, B., van der Poll, J.A., Maaza, M.
17	Accredited Journals (ISI, IBSS or DHET Journals)	Thickness dependent morphological, structural and optical properties of SS/CuO nanocoatings as selective solar absorber	<ul style="list-style-type: none"> ● Online ● Published 	Infrared Physics 113, 103619 (2021)	Welegergs, G.G., Gebretnisae, H.G., Tsegay, M.G., (...), Dube, S., Maaza, M.
18	Accredited Journals (ISI, IBSS or DHET Journals)	Experimental and theoretical studies of the solidstate performance of electrodeposited Yb ₂ O ₃ /As ₂ Se ₃ nanocomposite films	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Alloys and Compounds 855, 157324 (2021)	Whyte, G.M., Awada, C., Offor, P.O., (...), Maaza, M., Ezema, F.I.
19	Accredited Journals (ISI, IBSS or DHET Journals)	Analysis of entropy and effect of surface dynamics on photovoltaic performance	<ul style="list-style-type: none"> ● Online ● Published 	IOP Conference Series: Earth and Environmental Science 655(1), 012056	Abodunrin, T.J., Usikalu, M.R., Emetere, M.E., (...), Kotsedi, C., Maaza, M.
20	Accredited Journals (ISI, IBSS or DHET Journals)	Luminescent MoS ₂ Quantum Dots with Tunable Operating Potential for Energy-Enhanced Aqueous Supercapacitors	<ul style="list-style-type: none"> ● Online ● Published 	ACS Omega 6(7), pp. 4542-4550(2021)	Panchu, S.J., Raju, K., Swart, H.C., (...), Henini, M., Moodley, M.K.

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21	Accredited Journals (ISI, IBSS or DHET Journals)	Molecular dynamics and biosynthesis of phoenix dactylifera mediated Mn ₃ O ₄ nanoparticles: Electrochemical application	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Alloys and Compounds 854,156987 (2021)	Sackey, J., Akbari, M., Morad, R., (...), Matinise, N., Maaza, M.
22	Accredited Journals (ISI, IBSS or DHET Journals)	Biogenic synthesis enhanced structural, morphological, magnetic and optical properties of zinc ferrite nanoparticles for moderate hyperthermia applications	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Nanoparticle Research 23(2),47 (2021)	Aisida, S.O., Ali, A., Oyewande, O.E., (...), Maaza, M., Ezema, F.I.
23	Accredited Journals (ISI, IBSS or DHET Journals)	Laser fabrication of Cu nanoparticles based nanofluid with enhanced thermal conductivity: Experimental and molecular dynamics studies	<ul style="list-style-type: none"> ● Online ● Published 	Journal of Molecular Liquids 323,114975 (2021)	Khamliche, T., Khamlich, S., Moodley, M.K., (...), Henini, M., Maaza, M.
24	Accredited Journals (ISI, IBSS or DHET Journals)	An overview of the mathematical modelling of perovskite solar cells towards achieving highly efficient perovskite devices	<ul style="list-style-type: none"> ● Online ● Published 	International Journal of Energy Research 45(2), pp. 1496-1516 (2021)	Nkele, A.C., Ike, I.S., Ezugwu, S., Maaza, M., Ezema, F.I.
25	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis of new pyridines with sulfonamide moiety: via a cooperative vinyllogous anomeribased oxidation mechanism in the presence of a novel quinoline-based dendrimer-like ionic liquid	<ul style="list-style-type: none"> ● Online 	RSC Advances 11(5), pp. 3143-3152	Torabi, M.,Yarie, M., Zolfigol, M.A., (...), Maaza, M., Msagati, T.A.M.

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26	Accredited Journals (ISI, IBSS or DHET Journals)	Bio-synthesised black α -Cr ₂ O ₃ nanoparticles; experimental analysis and density function theory calculations	● Online	Journal of Alloys and Compounds 850,156671(2021)	Sackey, J., R. Morad, Bashir, A.K.H., (...), C.Kaonga, Maaza, M.
27	Accredited Journals (ISI, IBSS or DHET Journals)	Functional metal oxides synthesized using natural extracts from waste maize materials	● Online	Current Research in Green and Sustainable Chemistry 4,100054 (2021)	Nwanya, A.C., Botha, S., Ezema, F.I., Maaza, M.
28	Accredited Journals (ISI, IBSS or DHET Journals)	Noble Metal Ion Embedded Nanocomposite Glass Materials for Optical Functionality of UV-Visible Surface Plasmon Resonance (SPR) Surface-Enhanced Raman Scattering (SERS) Xray and Electron Microscopic Studies: An Overview	● Online	Plasmonics (2021)	Gaur, R., Manikandan, P., Manikandan, D., (...), Maaza, M., Elayaperumal, M.
29	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis, characterization and ab initio study of WO ₃ nanocubes with peculiar electrochemical properties	● Online	Journal of Nanoparticle Research 23(1), 31 (2021)	Bashir, A.K.H., Morad, R., Nwanya, A.C., (...), Ezema, F.I., Maaza, M.
30	Accredited Journals (ISI, IBSS or DHET Journals)	A novel biogenic Allium cepa leaf mediated silver nanoparticles for antimicrobial, antioxidant, and anticancer effects on MCF-7 cell line	● Online	Environmental Research 198,111199 (2021)	Mani, M., Okla, M.K., Selvaraj, S., (...), Ahmed Almunqedhi, B.M., Elshikh, M.S.
31	Accredited Journals (ISI, IBSS or DHET Journals)	Effect of strain rates on the plastic deformation behavior and serrated flow of Zr ₅₅ .7Cu _{22.4} Ni _{7.2} Al _{14.7} bulk metallic glass	● Online	Materials Today Communications 27,102320 (2021)	Zhu, K., Tao, P., Zhang, C., (...), Yang, Y., Kaviyarasu, K.
32	Accredited Journals (ISI, IBSS or DHET Journals)	Construction and Characterization of Photodiodes prepared with Bi ₂ S ₃ Nanowires	● Online	Journal of Alloys and Compounds 863,158681 (2021)	Arumugam, J., George, A., Raj, A.D., (...), Elshikh, M.S., Kaviyarasu, K.

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33	Accredited Journals (ISI, IBSS or DHET Journals)	Current trends of Silver doped Zinc oxide nanowires photocatalytic degradation for energy and environmental application	● Online	Surfaces and Interfaces 23,100931 (2021)	Mangala Nagasundari, S., Muthu, K., Kaviyarasu, K., Farraj, D.A.A., Alkufeidy, R.M.
34	Accredited Journals (ISI, IBSS or DHET Journals)	The role of solvent additive in metal nanocomposite doped thin film organic solar cell	● Online	IOP Conference Series: Earth and Environmental Science 665(1),012020 (2021)	Kesinro, R.O., Boyo, A.O., Akinyemi, M.L., (...), Emetere, M.E., Aizebeokhai, A.P.
35	Accredited Journals (ISI, IBSS or DHET Journals)	Vibrational, spectroscopic, chemical reactivity, molecular docking and in vitro anticancer activity studies against A549 lung cancer cell lines of 5-Bromo-indole-3-carboxaldehyde	● Online	Journal of Molecular Recognition 34(3), 2873 (2021)	Christopher Jeyaseelan, S., Milton Franklin Benial, A., Kaviyarasu, K.
36	Accredited Journals (ISI, IBSS or DHET Journals)	Bio-distribution of selenium nanoparticles (SeNPs) to the Wistar rats and its breastfed offspring	● Online	Journal of Drug Delivery Science and Technology 61,102299(2021)	Chandramohan, S., Naveenkumar, S., Kaviyarasu, K., (...), Santhanakumar, M., Muthukumar, A.
37	Accredited Journals (ISI, IBSS or DHET Journals)	Selectivity, stability and reproducibility effect of CeM - CeO ₂ modified PIGE electrode for photoelectrochemical behaviour of energy application	● Online	Surfaces and Interfaces 22,100835(2021)	Amanulla, A.M., Magdalane, C.M., Saranya, S., Sundaram, R., Kaviyarasu, K.
38	Accredited Journals (ISI, IBSS or DHET Journals)	Influence of solvent and precursor concentration on the properties of NiV ₂ O ₆ nanoparticles	● Online	Surfaces and Interfaces 21,100711 (2021)	George, A., Raj, A.D., Irudayaraj, A.A., (...), Kennedy, J., Kaviyarasu, K.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
39	Accredited Journals (ISI, IBSS or DHET Journals)	Molecular dynamics and biosynthesis of phoenix dactylifera mediated Mn ₃ O ₄ nanoparticles: Electrochemical application	● Online	Journal of Alloys and Compounds 854, 156987 (2021)	J. Sackey, M. Akbari, R. Morad, A. Bashir; N. M. Ndiaye, N. Matinise, M. Maaza
40	Accredited Journals (ISI, IBSS or DHET Journals)	First principle simulation of coated hydroxychloroquine on Ag, Au and Pt nanoparticles	● Online	Nature Scientific Report Journal 11, 2131 (2021)	R. Morad, M. Akbari, P. Rezaee, A. Koochaki, M. Maaza, Z. Jamshidi,
41	Accredited Journals (ISI, IBSS or DHET Journals)	Bio-synthesised black a-Cr ₂ O ₃ nanoparticles; experimental analysis and density function theory calculations	● Online	Journal of Alloys and Compounds 850, 156671 (2021)	J. Sackey, R. Morad, A.K.H. Bashir, L. Kotsedi, C. Kaonga, M. Maaza
42	Accredited Journals (ISI, IBSS or DHET Journals)	Enhanced photoelectrochemical performance of TiO ₂ nanofiber arrays decorated with CdS nanoparticles via SILAR method.	● Online	European Physical Journal. Applied Physics, 93 (2021)	Naceur, J.B., Ouertani, R., Jrad, F., Khamlich, S., Dimassi, W. and Chtourou, R.
43	Accredited Journals (ISI, IBSS or DHET Journals)	Precursor effects on the physical, biological and catalytic properties of Fagonia indica (Burm.) mediated ZnO NPs.	● Accepted	Microscopy Research and Technique, 2021	Hameed, Safia; Khalil, Ali; Ali, Muhammad; Iqbal, Javed; Rehman, Lubna; Numan, Muhammad; Ullah, Ikram; Khamlich, Saleh; Maaza, Malik; Shinwari, Zabta Khan
44	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis and characterization of TiO ₂ doped cobalt ferrite nanoparticles via microwave method: Investigation of photocatalytic performance of congo red degradation dye	● Online	Surfaces and Interfaces, Volume 25, August 2021, 101296 (Elsevier)	C. Maria Magdalane, G. Maria Assuntha Priyadharsini, K. Kaviyarasu, A. Irudaya Jothi, G. Gnanamani Simiyon
45	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis and Characterization of Bi ₂ O ₃ NPS and Photocatalytic Application with Methylene Blue	● Online	Research Square	Fowziya Shaik Ali SA, Faisal Al Marzouqi, M. Ragamathunnisa, Mohamed Jahangir AR, A. Ayeshamaria m, K. Kaviyarasu

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
46	Accredited Journals (ISI, IBSS or DHET Journals)	Construction and Characterization of Photodiodes prepared with Bi ₂ S ₃ Nanowires	● Online	Journal of Alloys and Compounds, Volume 863, 15 May 2021, 158681 (Elsevier)	J. Arumugam, Amal George, A. Dhayal Raj, A. Albert Irudayaraj, R.L. Josephine, S. John Sundaram, Amal M. Al-Mohaimeed, Wedad A. Alonazi, Mohamed Soliman Elshikh, K. Kaviyarasu
47	Accredited Journals (ISI, IBSS or DHET Journals)	Current trends of Silver doped Zinc oxide nanowires photocatalytic degradation for energy and environmental application	● Online	Surfaces and Interfaces, Volume 23, April 2021, 100931 (Elsevier)	S. Mangala Nagasundari, K. Muthu, K. Kaviyarasu, Dunia A. Al Farraj, Roua
48	Accredited Journals (ISI, IBSS or DHET Journals)	Bio-distribution of selenium nanoparticles (SeNPs) to the Wistar rats and its breastfed offspring	● Online	Journal of Drug Delivery Science and Technology, Volume 61, February 2021, 102299 (Elsevier)	Subburaman Chandramohan, Suresh Naveenkumar, K. Kaviyarasu, Vuppalapati Lavakumar, C. Sowmya, M. Santhanakumar, A.
49	Accredited Journals (ISI, IBSS or DHET Journals)	Selectivity, stability and reproducibility effect of CeM/CeO ₂ modified PIGE electrode for photoelectrochemical behaviour of energy application	● Online	Surfaces and Interfaces Volume 22, February 2021, 100835 (Elsevier)	A. Mobeen Amanulla, C. Maria Magdalane, S. Saranya, R. Sundaram, K. Kaviyarasu,
50	Accredited Journals (ISI, IBSS or DHET Journals)	Microwave assisted growth of highly oriented vanadium oxides nanostructures: structural, vibrational and electrical properties	● Online	Applied Physics A: Materials Science and Processing, 2021, 127(12), 934	Derkaoui, I., Khenfouch, M., Boukhoubza, I., ...Jorio, A., Maaza, M.
51	Accredited Journals (ISI, IBSS or DHET Journals)	Radiations hardness of nanocrystalline nickel under 450 keV protons	● Online	Radiation Physics and Chemistry, 2021, 189, 109740	Salhi, M., Abaidia, S.E.K., Mammeri, S., ...Kpeglo, D., Maaza, M.

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52	Accredited Journals (ISI, IBSS or DHET Journals)	Precursor effects on the physical, biological, and catalytic properties of <i>Fagonia indica</i> Burm.f. mediated zinc oxide nanoparticles	● Online	Microscopy Research and Technique, 2021, 84(12), pp. 3087–3103	Hameed, S., Khalil, A.T., Ali, M., ...Alasmari, F., Shinwari, Z.K. Maaza, M.
53	Accredited Journals (ISI, IBSS or DHET Journals)	Industrial dye removal using biosynthesized Agdoped ZnO nanoparticles	● Online	Environmental Nanotechnology, Monitoring and Management, 2021, 16, 100463	Noukelag, S.K., Razanamahandy, L.C., Ntwampe, S.K.O., Arendse, C.J., Maaza, M.
54	Accredited Journals (ISI, IBSS or DHET Journals)	Ultrananocrystalline diamond-like carbon (UN-DLC) assembled on epitaxial ZnO film by PLD technique and SIMS Raman Rutherford spectroscopic fingerprint investigation	● Online	Journal of Raman Spectroscopy, 2021, 52(11), pp. 1838–1846	Elayaperumal, M., Gnanasekaran, K., Moodley, M.K., ...Ladchumananandasivam, R., Maaza, M.
55	Accredited Journals (ISI, IBSS or DHET Journals)	Ultrasoundassisted wet chemical synthesis of texturized Mo/MoO ₃ spectrally selective solar absorber coatings	● Online	Thin Solid Films, 2021, 735, 138892	Akoba, R., Abdullahi, S.A., Sackey, J., ...Nuru, Z.Y., Maaza, M.
56	Accredited Journals (ISI, IBSS or DHET Journals)	Silver nanoparticles biosynthesized from secondary metabolite producing marine actinobacteria and evaluation of their biomedical potential	● Online	Antonie van Leeuwenhoek, International Journal of General and Molecular Microbiology, 2021, 114(10), pp. 1497–1516	Alam, A., Tanveer, F., Khalil, A.T., ...Shinwari, Z.K., Maaza, M.
57	Accredited Journals (ISI, IBSS or DHET Journals)	Degradation of Codeine Phosphate by simultaneous usage of eaq ⁻ and OH radicals in photoredox processes: Influencing factors, energy consumption, kinetics, intermediate products and degradation pathways	● Online	Optik, 2021, 243, 167415	Azizi, S., Sarkhosh, M., Najafpoor, A.A., ...Maaza, M., Sadani, M.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
58	Accredited Journals (ISI, IBSS or DHET Journals)	Noble Metal Ion Embedded Nanocomposite Glass Materials for Optical Functionality of UV-Visible Surface Plasmon Resonance (SPR) Surface-Enhanced Raman Scattering (SERS) X-ray and Electron Microscopic Studies: An Overview	● Online	Plasmonics, 2021, 16(5), pp. 1461–1493	Gaur, R., Manikandan, P., Manikandan, D., ...Maaza, M., Elayaperumal, M.
59	Accredited Journals (ISI, IBSS or DHET Journals)	Hydrothermal surface treatment of 434-L stainlesssteel for spectra solar absorber application	● Online	Infrared Physics and Technology, 2021, 117, 103848	Abdullahi, S.A., Akoba, R., Khamlich, S., ...Nuru, Z.Y., Maaza, M.
60	Accredited Journals (ISI, IBSS or DHET Journals)	Deposition of CaZrO ₃ thin films by EB-PVD: Effects of substrate on the composition, the structure, the morphology and the optical properties	● Online	Surfaces and Interfaces, 2021, 25, 101259	Hkiri, K., Mohamed, H.E.A., Khanyile, B.S., ...Maaza, M., Zouaoui, M.
61	Accredited Journals (ISI, IBSS or DHET Journals)	Studies on the spectrometric analysis of metallic silver nanoparticles (Ag NPs) using Basella alba leaf for the antibacterial activities	● Online	Environmental Research, 2021, 199, 111274	Mani, M., Pavithra, S., Mohanraj, K., ...Maaza, M., Kaviyarasu, K.
62	Accredited Journals (ISI, IBSS or DHET Journals)	Preparation and characterization of Fe doped hydroxyapatite for biomedical application	● Online	Surfaces and Interfaces, 2021, 25, 101185	Jose, S., Senthilkumar, M., Elayaraja, K., ...Maaza, M., Kaviyarasu, K.
63	Accredited Journals (ISI, IBSS or DHET Journals)	Scattering of $e \pm$ off silver atom over the energy range 1 eV–1 MeV	● Online	European Physical Journal D, 2021, 75(7), 204	Hassan, R., Nure Alam Abdullah, M., Shorifuddoza, M., ...Haque, A.K.F., Alfaz Uddin, M.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
64	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis and characterization of Sn-doped TiO ₂ film for antibacterial applications	<ul style="list-style-type: none"> Online 	Applied Physics A: Materials Science and Processing, 2021, 127(7), 498	Rajeswari, R., Venugopal, D., George, A., ...Maaza, M., Kaviyarasu, K.
65	Accredited Journals (ISI, IBSS or DHET Journals)	From Himba Indigenous Knowledge to Engineered Fe ₂ O ₃ UV-Blocking Green Nanocosmetics	<ul style="list-style-type: none"> To appear soon (Accepted) 	Nature Scientific Reports	
66	Accredited Journals (ISI, IBSS or DHET Journals)	Mercury goes Solid at room temperature at nanoscale and a potential Hg waste storage	<ul style="list-style-type: none"> In review process 	Nature Scientific Reports	N. Kana, R. Morad, M. Akbari, M. Henini, J. Niemela, F. Hacque, A. Gibaud, M. Maaza,
67	Accredited Journals (ISI, IBSS or DHET Journals)	From Khoi-San Indigenous Knowledge to Bioengineered CeO ₂ Nanocrystals to exceptional UV Blocking Green Nanocosmetics	<ul style="list-style-type: none"> In review process 	Nature Scientific Reports	
68	Accredited Journals (ISI, IBSS or DHET Journals)	A novel approach for engineering efficient nanofluids by radiolysis	<ul style="list-style-type: none"> In review process 	Nature Scientific Reports	
69	Accredited Journals (ISI, IBSS or DHET Journals)	The strange invisibility of cold neutrons in highly neutron absorbing B ₄ C: Towards a novel family of neutron optics	<ul style="list-style-type: none"> In review process 	Nature Scientific Reports	
70	Accredited Journals (ISI, IBSS or DHET Journals)	On the Remarkable Nonlinear Optical Properties of Natural tomato Lycopene	<ul style="list-style-type: none"> In review process 	Nature Scientific Reports	M. Maaza, S. Jeyaram, K. Kaviyarasu, J. Sackey, N. Numan, C. Kotsedi, M. Akbari, R. Morad, B. Sahraoui
71	Accredited Journals (ISI, IBSS or DHET Journals)	Effect of Ag doped MnO ₂ nanostructures suitable for wastewater treatment and other environmental pollutant applications	<ul style="list-style-type: none"> Online 	Environmental Research, 2022, 205, 112560	Panimalar, S., Logambal, S., Thambidurai, R., ...Kennedy, J., Kaviyarasu, K.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
72	Accredited Journals (ISI, IBSS or DHET Journals)	Shockwave treated seed germination and physiological growth of Vigna mungo (L) in red soil environment	● Online	Physiological and Molecular Plant Pathology, 2022, 117, 101747	Ramesh, R., Vidhya, V., Ali Khan, F.L., ...Elshikh, M.S., Kaviyarasu, K.
73	Accredited Journals (ISI, IBSS or DHET Journals)	Electrical and magnetic properties of nanostructured Ni doped CeO ₂ for optoelectronic applications	● Online	Journal of Physics and Chemistry of Solids, 2022, 160, 110369	Jayakumar, G., Albert Irudayaraj, A., Dhayal Raj, A., John Sundaram, S., Kaviyarasu, K.
74	Accredited Journals (ISI, IBSS or DHET Journals)	Photocatalytic effect of CuO nanoparticles flower-like 3D nanostructures under visible light irradiation with the degradation of methylene blue (MB) dye for environmental application	● Online	Environmental Research, 2022, 203, 111880	George, A., Magimai Antoni Raj, D., Venci, X., ...Chen, T-W., Kaviyarasu, K.
75	Accredited Journals (ISI, IBSS or DHET Journals)	Adsorption of copper and nickel by using sawdust chitosan nanocomposite beads – A kinetic and thermodynamic study	● Online	Environmental Research, 2022, 203, 111814	Kayalvizhi, K., Alhaji, N.M.I., Saravanakumar, D., ...Abdel Gawwad, M.R., Elshikh, M.S.
76	Accredited Journals (ISI, IBSS or DHET Journals)	Gum mediated synthesis and characterization of CuO nanoparticles towards infectious disease-causing antimicrobial resistance microbial pathogens	● Online	Journal of Infection and Public Health, 2021, 14(12), pp. 1893–1902	Nithiyavathi, R., John Sundaram, S., Theophil Anand, G., ...Samson, Y., Kaviyarasu, K.
77	Accredited Journals (ISI, IBSS or DHET Journals)	Biosynthesis, characterization, and antibacterial activity of gold nanoparticles	● Online	Journal of Infection and Public Health, 2021, 14(12), pp. 1842–1847	Sathiyaraj, S., Suriyakala, G., Dhanesh Gandhi, A., ...Chen, T-W., Kaviyarasu, K.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
78	Accredited Journals (ISI, IBSS or DHET Journals)	Thermoelectric Power of Silver Telluride Thin Films and its Thermal Conductivity Applications	● Online	Asian Journal of Chemistry, 2021, 33(11), pp. 2615–2620	Prem Nawaz, M., Palanivelu, M., Karunanithy, M., ...Ayeshamariam, A., Kaviyarasu, K.
79	Accredited Journals (ISI, IBSS or DHET Journals)	Annealing dependent synthesis of cytocompatible nanosilver/calcium hydroxyapatite composite for antimicrobial activities	● Online	Arabian Journal of Chemistry, 2021, 14(11), 103404	Gandhi, A.D., Kaviyarasu, K., Supraja, N., ...Elshikh, M.S., Chen, T.-W.
80	Accredited Journals (ISI, IBSS or DHET Journals)	Improved Ag doped Bi ₂ S ₃ nanowire-based photodiode: Fabrication and performance	● Online	Materials Letters, 2021, 302, 130403	Arumugam, J., George, A., Dhayal Raj, A., ...Balasubramanian, B., Kaviyarasu, K.
81	Accredited Journals (ISI, IBSS or DHET Journals)	Systematic green synthesis of silver oxide nanoparticles for antimicrobial activity	● Online	Environmental Research, 2021, 202, 111627	Mani, M., Harikrishnan, R., Purushothaman, P., ...Balasubramanian, B., Kaviyarasu, K.
82	Accredited Journals (ISI, IBSS or DHET Journals)	Synthesis and characterization of TiO ₂ doped cobalt ferrite nanoparticles via microwave method: Investigation of photocatalytic performance of congo red degradation dye	● Online	Surfaces and Interfaces, 2021, 25, 101296	Magdalane, C.M., Priyadharsini, G.M.A., Kaviyarasu, K., Jothi, A.I., Simiyon, G.G.
83	Accredited Journals (ISI, IBSS or DHET Journals)	Influence of beam energy on properties of Nickel nanowires	● Online	Surface Review and Letters, 2021, 2250028	Honey, S., Asim, J., Kasinathan, K., ...Ahmad, I., Zhao, T.
84	Accredited Journals (ISI, IBSS or DHET Journals)	Bio-conjugate of magnesium ferrite nanoparticles in aqueous Allium cepa extract for self-heating potency	● Online	Applied Physics A: Materials Science and Processing, 2022, 128(1), 7	Aisida, S.O., Mahmood, A., Ahmad, I., Zhao, T.-K., Ezema, F.I.
85	Accredited Journals (ISI, IBSS or DHET Journals)	Nanostructured Mn-doped CeO ₂ thin films with enhanced electrochemical properties for pseudocapacitive applications	● Online	Journal of Alloys and Compounds, 2021, 886, 161206	Nwachukwu, I.M., Nwanya, A.C., Osuji, R., Ezema, F.I.

No	Research output	Title of the article / book chapter	Submitted / accepted / published	Journal name	Authors
86	Accredited Journals (ISI, IBSS or DHET Journals)	Mathematical models for thermionic emission current density of graphene emitter	● Online	Nature Scientific Reports, 2021, 11(1), 22503	Olawole, O.C., De, D.K., Oyedepo, S.O., Ezema, F.I.
87	Accredited Journals (ISI, IBSS or DHET Journals)	Effects of annealing temperature on TiO ₂ photoelectrodes of dye-sensitized solar cells using Ixora coccinea dye extract	● Online	Journal of Nanoparticle Research, 2021, 23(10), 228	Onah, E.O., Onuorah, M.A., Offiah, S.U., ...Ugwuoke, P.E., Ezema, F.I.
88	Accredited Journals (ISI, IBSS or DHET Journals)	Recent Advancements in Energy Storage Based on Sodium Ion and Zinc Ion Hybrid Supercapacitors	● Online	Energy and Fuels, 2021, 35(18), pp. 14241–14264	Shaikh, N.S., Lokhande, V.C., Prasertdam, S., ...Shaikh, J.S., Kanjanaboos, P.
89	Book chapters	Green synthesis of Spinel ZnCo ₂ O ₄ nanomaterial via Moringa Oleifera as high electrochemical electrode for supercapacitors	● Online	Jacobs Journal of Materials Science 2018. 2(1). 004	N. Matinise
90	Book chapters	15th Chapter - Advanced applications of magnetic nanoparticles in water purification	● Online	https://www.elsevier.com/books/applications-of-advanced-green-materials/ahmed/978-0-12-820484-9 Applications of Advanced Green Materials - Elsevier Edited by Shakeel Ahmed	A. Ayeshamariam, K. Kaviyarasu, N.M.I. Alhaji, M. Kavin Micheal, M. Jayachandran

No	Name of conference / peer reviewed conference proceedings	Title	Authors
1	Laser-induced breakdown spectroscopy (LIBS) on geological materials: Relative hardness estimation	Materials Today: Proceedings 36, pp. 600-603 (2021)	Panya Panya, S.N., Galmed, A.H., Maaza, M., Mothudi, B.M., Harith, M.A.
2	A study of the temperature effect on photoluminescence of the P3HT/ MWNT nanocomposites	Materials Today: Proceedings 36, pp. 549-552 (2021)	Bakour, A., Bajjou, O., Baitoul, M., (...), Maaza, M., Faulques, E.
3	Antibacterial effect of silver nanoparticles synthesised on a polycarbonate membrane	Materials Today: Proceedings 36 (2021) 368–373, https://doi.org/10.1016/j.matpr.2020.04.217	Tsegay, M.G., Gebretinsae, H.G., Sackey, J., Maaza, M., Nuru, Z.Y.
4	Green synthesis of khat mediated silver nanoparticles for efficient detection of mercury ions	Green synthesis of Spinel ZnCo ₂ O ₄ nanomaterial via Moringa Oleifera as high electrochemical electrode for supercapacitors	N. Matinise
5	Biosynthesis of CuO nanoparticles using Mimosa hamata extracts	Materials Today: Proceedings 36 (2021) 540–548, https://doi.org/10.1016/j.matpr.2020.05.325	Sackey, J., Razanamahandry, L.C., Ntwampe, S.K.O., Mlungisi, N., Fall, A., Kaonga, C. Nuru, Z. Y.
6	Bio-synthesis and characterization of nanoscaled CdO using corn husk extract via green nanochemistry	Materials Today: Proceedings, 2021, 36, pages 534–539, https://doi.org/10.1016/j.matpr.2020.05.324	Bakayoko, M., Sackey, J., Razanamahandry, L.C., Ngom, B.D., Ntwampe, S.K.O.
7	Biosynthesis of zinc oxide nanoparticles using extracts of Moringa Oleifera: Structural and optical properties	Materials Today: Proceedings, 2021, 36, pages 526–533, https://doi.org/10.1016/j.matpr.2020.05.323	Ngom, I., Ngom, B.D., Sackey, J., Khamlich, S.
8	Synthesis of graphene sheets from graphite flake mediated with extracts of various indigenous plants from Madagascar.	Materials Today: Proceedings, 36, pp. 553-558. (2021)	Andrianiaina, H., Razanamahandry, L.C., Sackey, J., Ndimba, R., Khamlich, S., and Maaza, M.
9	Investigation of structural and optical properties of CdO nanoparticles via peel of Citrus x sinensis	Materials Today: Proceedings, 36 (2021) 298–302 https://doi.org/10.1016/j.matpr.2020.04.057	Fall, A., Sackey, J., Mayedwa, N., Ngom, B.D.
10	Nanostructured black moly surfaces for solar thermal absorbers by wet chemical etching	Materials Today: Proceedings, 36, pp. 251-255. (2021)	Akoba, R., Welegergs, G.G., Selwyn, D.W., Numan, N., Sackey, J., Nuru, Z. Y.
11	Characterization of vertically-oriented graphene nanosheets grown on copper substrate	Materials Today: Proceedings; https://doi.org/10.1016/j.matpr.2020.03.305	M. Akbari, M. Kamruddin, R. Morad, S. Khamlich, R. Bucher
12	Biosynthesis of BiVO ₄ nanorods using Callistemon viminalis extracts: Photocatalytic degradation of methylene blue	Materials Today: Proceedings, 36, pp. 328-335. (2021)	Mohamed, H.E.A., Sone, B.T., Khamlich, S., Coetsee-Hugo, E., Swart, H.C., Thema, T., Sbiaa, R. and Dhlamini, M.S.,
13	Characterization of vertically-oriented graphene nanosheets grown on copper substrate.	Materials Today: Proceedings, 36, pp. 232-236 (2021)	Akbari, M., Kamruddin, M., Morad, R., Khamlich, S., Bucher, R.
14	Synthesis and characterization of iron oxide nanoparticles capped with Moringa Oleifera: The mechanisms of formation effects on the optical, structural, magnetic and morphological properties	Materials Today: Proceedings, 36(2) (2021) 214-218	Samson O Aisida, Kenneth Ugwu, Paul A Akpa, Assumpta C Nwanya, U Nwankwo, AKH Bashir, IG Madiba, Ishaq Ahmed, Fabian I Ezema

No	Name of conference / peer reviewed conference proceedings	Title	Authors
15	Effect of annealing on hydrothermally deposited Co ₃ O ₄ -ZnO thin films for supercapacitor applications	Materials Today: Proceedings, 36(2) (2021) 374-378	Raphael M Obodo, Ugochi Chime, Agnes C Nkele, Assumpta C Nwanya, AKH Bashir, IG Madiba, M Asjad, I Ahmad, T Zhao, N Thovhogi, Fabian I Ezema
16	Zinc zirconate (ZnZrO ₃) nanocomposites bimetallic designed by green synthesis via Moringa Olefeira extract for highperformance electrochemical applications	Materials today: Proceedings, 36(2) (2021) 401-407	N Matinise, N Mayedwa, K Kaviyarasu, ZY Nuru, IG Madiba, N Mongwaketsi, X Fuku, M Maaza
17	Effect of concentration of trisodium citrate complexing agent on spraysynthesized ZnS thin films	Materials Today: Proceedings 36(2) (2021) 133-140	PO Ofor, SN Ude, GM Whyte, FU Otung, IG Madiba, AKH Bashir, N Thovhogi, BA Okorie, Fabian I Ezema
18	Studies on unidirectional grown L-proline lithium bromide an NLO material for optoelectronic applications	Materials Today: Proceedings 36, 126-129, 2021 (Elsevier)	G. Ramesh, R. Uthrakumar, M.E. Raja Saravanan, M. Kumar, G. Gobi, C. Inmozhi, K. Kaviyarasu
19	Unstable cell efficiency in CdS quantum dot sensitized solar cell using low cost lugols iodine aqueous electrolyte	Materials Today: Proceedings 36, 159-162, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.674	R. Vignesh, B. Arjun kumar, A. Muthuvinayagam, T. Elangovan, K. Kaviyarasu, G. Theophil Anand, G. Ramalingam
20	Effect of PVA/PVP protective agent on the formation of silver nanoparticles and its photocatalytic and antimicrobial activity	Materials Today: Proceedings 36, 121-125, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.002	V. Badineni, H. Maseed, A. Sai Kumar, Y. Subbareddy, B. Vijaya Kumar Naidu, K. Kaviyarasu
21	Efficacy of dye degradation of contaminated soil microbial isolates	Materials Today: Proceedings 36, 167-170, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.692	M. Biruntha, J. Archana, K. Kavitha, K. Vanimuthu, B. Karunai Selvi, J. Arockia John Paul, R.M. Vithyavathy, K. Kaviyarasu, G. Ramalingam
22	Investigations on structural, electrical, and third order nonlinear optical properties of benzimidazolium maleate single crystal	Materials Today: Proceedings 36, 163-166, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.680	S. Sakthy Priya, K. Balakrishnan, P. Surendran, A. Lakshmanan, S. Pushpalatha, G. Ramalingam, P. Rameshkumar, K. Kaviyarasu, T. Ashok Hegde, G. Vinitha
23	Optical and nonlinear optical properties of Zn _{0.96} Cu _{0.04} Al ₂ O ₄ nanocomposites prepared by combustion method	Materials Today: Proceedings 36, 175-178, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.722	P. Surendran, A. Lakshmanan, S. Sakthy Priya, K. Balakrishnan, T. Ashok Hegde, G. Vinitha, G. Ramalingam, P. Rameshkumar, K. Kaviyarasu
24	Synthesis and characterization of CeO ₂ nanoparticles by hydrothermal method	Materials Today: Proceedings 36, 130-132, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.283	C. Maria Magdalane, K. Kaviyarasu, B. Siddhardha, G. Ramalingam,
25	Growth and characterization studies of rosaniline dye with KDP single crystal for optoelectronic applications	Materials Today: Proceedings 36, 155-158, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.670	V. Manivannan, N. Bhadhusa, R. Rajapriya, T. Gunasekaren, R. Uthrakumar, K. Kaviyarasu

No	Name of conference / peer reviewed conference proceedings	Title	Authors
26	Synthesis, growth, structural, optical, thermal and mechanical studies on cadmium nitrate pnitrophenol: A semi-organic nonlinear optical application	Materials Today: Proceedings 36, 179-183, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.795	E. Chinnasamy, N. Indumathi, A. Hemalatha, A. Venkatesan, M.E. Raja Saravanan, R. Uthrakumar, K. Deepa, S. Senthil, K. Kaviyarasu
27	Superficial preparation of biocompatible carbon quantum dots for antimicrobial applications	Materials Today: Proceedings 36, 171-174, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.694	A. Lakshmanan, P. Surendran, N. Manivannan, M. Sathish, C. Balalakshmi, N. Suganthy, P. Rameshkumar, K. Kaviyarasu, G. Ramalingam
28	Structural properties of TiN thin films prepared by RF reactive magnetron sputtering	Materials Today: Proceedings 36, 146-149, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.668	R. Dhanaraja, S.B. Mohamed, M. Kamruddin, K. Kaviyarasu, P.A. Manojkumar
29	Synthesis and characterization of nanohydroxyapatite/graphene oxide composite materials for medical implant coating applications	Materials Today: Proceedings 36, 204-207, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.932	M. Kaviya, P. Ramakrishnan, S.B. Mohamed, R. Ramakrishnan, J. Gimburn, K.M. Veerabadran, M.R. Kuppusamy, K. Kaviyarasu, T.M. Sridhar
30	Synthesis of Mn ₃ O ₄ nano complex using aqueous extract of Helianthus annuus seed cake and its effect on biological growth of Vigna radiata	Materials Today: Proceedings 36, 184-191, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.883	R. Ramesh, G. Catherine, S. John Sundaram, F. Liakath Ali Khan, K. Kaviyarasu
31	Third order nonlinear optical and electrical properties of new sulphamic acid lithium chloride single crystal	Materials Today: Proceedings 36, 141-145, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.383	N. Indumathi, E. Chinnasamy, S. Arulmani, A. Venkatesan, M.E.Raja Saravanan, K. Deepa, C. Inmozhi, S. Senthil, K. Kaviyarasu, R. Uthrakumar
32	Preparation and characterization studies of pure and Li ⁺ doped ZnO nanoparticles for optoelectronic applications	Materials Today: Proceedings 36, 228-231, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.03.228	M. Chandrasekar, S. Panimalar, R. Uthrakumar, M. Kumar, M.E. Raja Saravanan, G. Gobi, P. Matheswaran, C. Inmozhi, K.Kaviyarasu
33	Selforganization of layered perovskites on TiO ₂ nanotubes surface by atomic layer deposition	Materials Today: Proceedings 36, 364-367, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.04.153	F.F. Orudzhev, Sh.M. Ramazanov, A.B. Isaev, N.M.R. Alikhanov, D. Sobola, M.Yu. Presniakov, K. Kaviyarasu
34	Synthesis and characterization of L-threonine lithium chloride (LTLC): A new semiorganic nonlinear optical single crystal for laser applications	Materials Today: Proceedings 36, 150-154, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.669	N. Indumathi, A. Hemalatha, E. Chinnasamy, A. Venkatesan, M.E. Raja Saravanan, K. Deepa, P. Matheswaran, S. Senthil, K. Kaviyarasu, R. Uthrakumar
35	Investigation of structural and optical properties of NiO nanoparticles mediated by Plectranthus amboinicus leaf extract	Materials Today: Proceedings 36, 268-272, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.03.581	R. Ramesh, V. Yamini, S. John Sundaram, F. Liakath Ali Khan, K. Kaviyarasu
36	Robust Hg _{0.023} WO ₃ nanoparticles: Synthesis, characterization and application as relative humidity sensing material and photocatalyst for degradation of organic dye contamination	Materials Today: Proceedings 36, 192-198, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.02.925	R. Renukadevi, R. Sundaram, K. Kaviyarasu
37	Biosynthesis of TiO ₂ nanoparticles by using natural extract of Citrus sinensis	Materials Today: Proceedings 36, 349-356, 2021(Elsevier). https://doi.org/10.1016/j.matpr.2020.04.131	A. Fall, I. Ngom, M. Bakayoko, N. Fatou Sylla, H. Elsayed Ahmed Mohamed, K. Jadvi, K. Kaviyarasu, B.D. Ngom

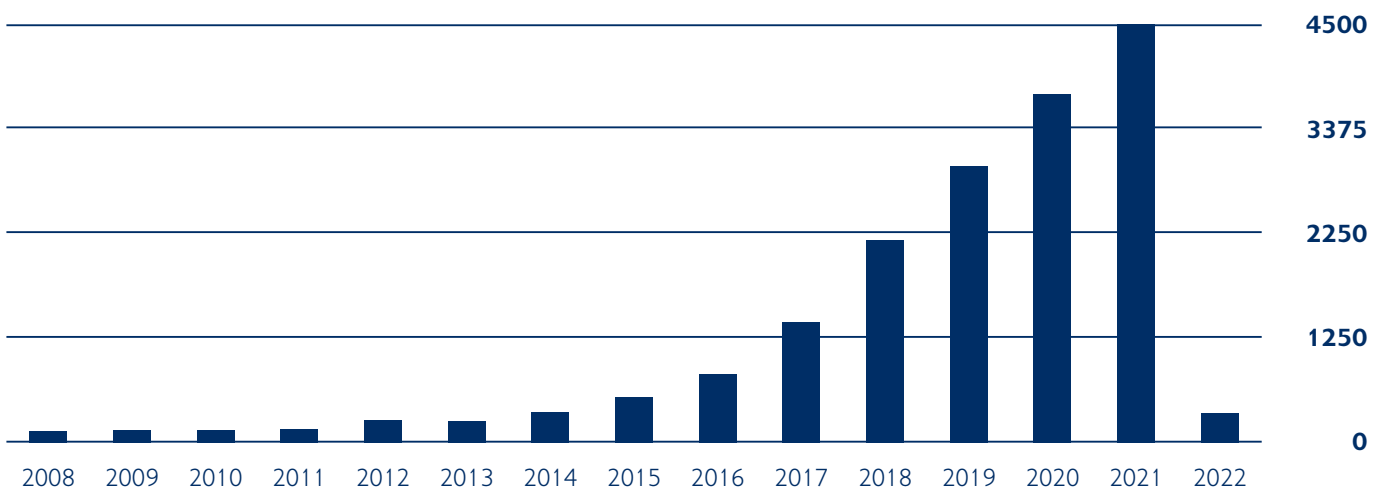
No	Name of conference / peer reviewed conference proceedings	Title	Authors
38	New device for inkjet-printed electronics	Materials Today: Proceedings 36, 263-267, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.03.527	N.S. Shabanov, A.K. Akhmedov, A.B. Isaev, A.Sh. Asvarov, K.Sh. Rabadanov, K. Kaviyarasu
39	Photoelectrocatalytic activity PbO ₂ loaded highly oriented TiO ₂ nanotubes arrays,	Materials Today: Proceedings 36, 325-327, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.04.111	Z.M. Alimirzaeva, A.B. Isaev, N.S. Shabanov, A.G. Magomedova, M.V. Kadiev, K. Kaviyarasu
40	Optical, structural and electrical properties of AgSbO ₃ nanotips prepared by thermal evaporation technique for thermoelectric effect applications	Materials Today: Proceedings 36, 492-498, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.148	P. Mohamed Anwar, S. Muruganatham, M. Karunanithy, M. Benhaliliba, A. Ayeshamariam, M. Jayachandran, K. Kaviyarasu
41	Structural and luminescence properties changes study of VO ₂ nanostructures induced by gamma irradiation	Materials Today: Proceedings 36, 595-599, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.651	A. Simo, P. Beukes, K. Kaviyarasu, N. Numan, X. Fuku, M. Nkosi
42	Effect of doping concentration for the properties of Fe doped TiO ₂ thin films applications	Materials Today: Proceedings 36, 468-474, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.109	R. Rajeswari, D. Venugopal, A. Dhayal Raj, J. Arumugam, S. John Sundaram, K. Kaviyarasu
43	Two step synthesis of vanadium pentoxide thin films for optoelectronic applications	Materials Today: Proceedings 36, 464-467, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.104	Amal George, A. Dhayal Raj, A. Albert Irudayaraj, D. Magimai Antoni Raj, X. Venci, G. Jayakumar, J. Arumugam, M. Senthil Kumar, S. John Sundaram, K. Kaviyarasu
44	Synthesis and characterizations studies of ZnO and ZnO-SiO ₂ nanocomposite for biodiesel applications	Materials Today: Proceedings 36, 440-446, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.034	Mariet Justine, H. Joy Prabu, I. Johnson, D. Magimai Antoni Raj, S. John Sundaram, K. Kaviyarasu
45	Synthesis and characterizations studies of ZnO and ZnO-SiO ₂ nanocomposite for biodiesel applications	Materials Today: Proceedings 36, 440-446, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.05.034	Mariet Justine, H. Joy Prabu, I. Johnson, D. Magimai Antoni Raj, S. John Sundaram, K. Kaviyarasu
46	Microwave assisted green synthesis of CuO nanoparticles for environmental applications	Materials Today: Proceedings 36, 427-434, 2021 (Elsevier). https://doi.org/10.1016/j.matpr.2020.04.881	G. Theophil Anand, S. John Sundaram, K. Kanimozhi, R. Nithiyavathi, K. Kaviyarasu
47	The role of solvent additive in metal nanocomposite doped thin film organic solar cell	IOP Conf. Ser.: Earth Environ. Sci.665 012020, (IOP Publishing). https://iopscience.iop.org/article/10.1088/1755-1315/665/1/012020/meta	R.O. Kesinro, A.O. Boyo, M.L. Akinyemi, M.S.G. Hamed, K. Kaviyarasu, G.T. Mola, M.E. Emeter, A.P. Aizebeokhai,

Impact and influence

WHAT IMPACT DID THE PROGRAMME HAVE FOR THE RESEARCH CHAIR? EG. Promotion, NRF Rating and Research Career rekindled etc.

The UNESCO UNISA ITLABS/NRF Africa Chair in Nanosciences & Nanotechnologies (U2ACN2) has impacted and is impacting significantly at various levels:

1. Institutionally, the international metric citations have reached a value of 4492 citations by the international community, thus positioning UNISA as a global player in the field of nanosciences & nanotechnologies. This quality metric will likely contribute to the annual 2021 QS, MIT-Shanghai ranking of UNISA. (<https://scholar.google.co.za/citations?user=e6kaeYMAAAAJ&hl=fr>)



2. Two emerging scientists of the (U2ACN2) have been rated by the NRF in the categories Y2 & C2.
3. Internationalisation wise, the U2ACN2 has further cemented its international footprint, both on the African continent and within the North and the South, including in the Middle-East. This is reflected through the fast growing numbers of co-authored publications and joint funding applications.
4. The U2ACN2 Chair's reputation, both continentally and internationally, has been bolstered in view of the significant increase registered in applications from Africa and the South in general.
5. The programme has increased international partnership, such as those with the International Swedish Program (ISP) and the China-Pakistan for the South joint cooperation.
6. It is assisting four other emerging scientists to submit their NRF rating applications early 2022.
7. It has allowed three graduate fellows to be absorbed into the job-market.
8. It has allowed several postdoctoral fellows and emerging scientists to further their scientific academic profiles, each by attaining a higher Hindex above 20.

WHAT INFLUENCE DID YOU HAVE AS A RESULT OF THE CHAIR? EG. Policy Development or Patent application, etc.

The UNESCO UNISA ITLABS/NRF Africa Chair in Nanosciences & Nanotechnologies has impacted and is impacting significantly at various levels, including Policy Development. In this light, one should mention the following:

1. The United Nations Economic Commission for Africa (UNECA) is finalising a draft policy for the implementation of a continental NanoMSC at the continental level.
2. The University of Le Mans in Le Mans, France, has initiated a joint co-diploma in Nanosciences involving two Francophone Universities and two Anglophone Universities.
3. The University of Cheikh Anta Diop (UCAD), Dakar-Senegal, has embarked on a potential co-diploma in Nanosciences & Nanotechnologies, whereby three PhD students from UCAD will be graduating from both UCAD and UNISA.
4. Several previously graduated fellows have implemented nanosciences R&D programmes at their home institutions upon their return to their home countries.
5. The Chair has induced a mind shift within the chairholder – as well as in its fellows, who have submitted two Patents so far and are finalising three new patents.

Supervision and mentoring

MASTERS STUDENTS	Completed / Submitted / In Progress
Ms. B. Machabakacha	Graduated (CUM LAUDE) and started her PhD
Mr. J. Jadvy-Kouka	Graduated (CUM LAUDE) and started his PhD
Mr. F. Mabiala	Graduated and started his PhD
Mr. S. Sanelize Naugauza	To be submitted by end July 2021
Mr. J. Jadvy-Kouka	Graduated (CUM LAUDE) and started his PhD
Mr. S. Sanelize Naugauza	To be submitted by end July 2021
Mr. G. Kanningini	To be submitted by end July 2021
Ms. N. Nene Tandjigora	In progress
Ms. Z. Zerfie Mihabaw	In progress
Mr. D. Havenga	In progress
Mr. S. Snenkosi Dhlamini	In progress



DOCTORAL STUDENTS	Completed / Submitted / In Progress
Mr. (Dr) P.M. Kibasomba	Graduated
Mr. (Dr) S. Sfundo Khanyile	Graduated
Mr. (Dr) C. Mbambo Makhangela	Graduated
Mr. (Dr) M. Hamza	Graduated
Mr. B. Masara	Submitted
Mr. M. Akbari	To graduate early 2022
Mr. M.A. Saba	To graduate early 2022
Mrs. N. Thando Ntshangase Kana	To graduate early 2022
Mrs.T. Khamliche	Submitted external per review process
Mr. M. Akbari	Submitted external per review process
Ms. R. Akoba	To be submitted early 2022
Mr.H. Henok Gebretinsiae	To be submitted early 2022
Mr. M. Meresa Girmay	To be submitted early 2022
Mr. Giday Gebregziabher	To be submitted early 2022
Mr. M. Bakayoko	To be submitted early 2022
Mr. A. Adama-Fall	Submitted external per review process
Mr. I. Ngom	To be submitted early 2022
Mr. D. Kpeglo	In progress
Ms. Rosa Sambatra Ranaivoson	In progress
Mr T. Toky Andriambary	In progress
Ms. Nancy Davids	In progress
Mr. J. Juma Moses	In progress
Ms. Kh. Hkiri	In progress
Ms. L. Luleka Menzi	In progress
Ms. N. Nolfofundo Sintwa	In progress
Mrs. A. Aurelia Genu	In progress
Ms. A. Boitumelo Machabakacha	In progress
Mr. J. Jadvy Kouka	In progress

Details of the collaborators

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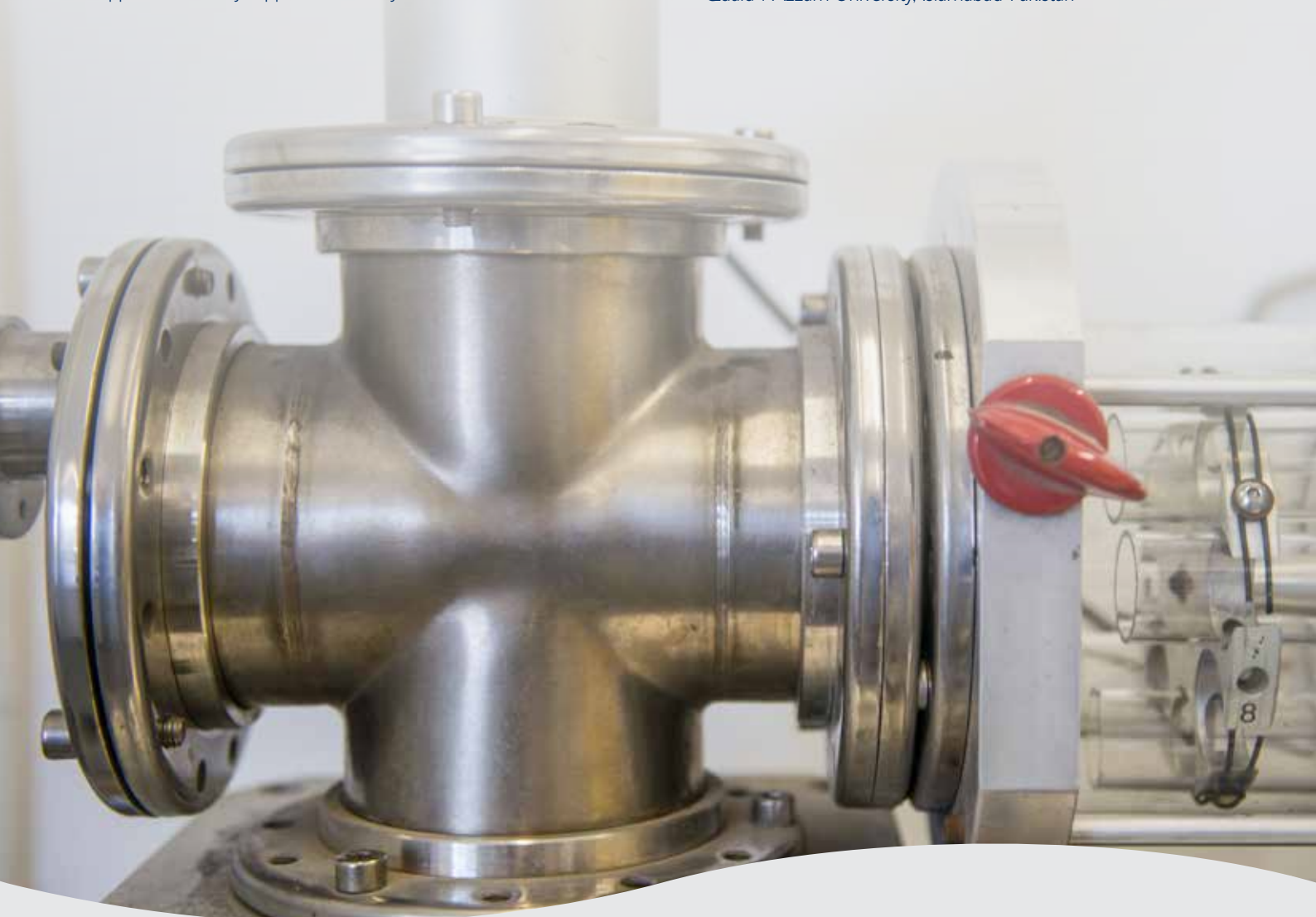
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Paulo, Brazil

Prof. Zabta Shinwari

Director
Quaid-i-Azzam University, Islamabad-Pakistan



Other external funding awarded

Name of the External Funder	South African Technology Agency (TIA)
Name of the fund/Grant awarded	South African-Egypt Cooperation /Innovation program
Amount Awarded for the current year	R 500,000.00
Total Amount Awarded	R 1 000,000.00
Name of the External Funder	French Government Foreign Ministry
Name of the fund/Grant awarded	ADESFA
Amount Awarded for the current year	R 1,700,000.00
Total Amount Awarded	R 1,700,000.00
Name of the External Funder	The World Academy of Science for the Developing World
Name of the fund/Grant awarded	TWAS-NRF Fellowships programme
Amount Awarded for the current year	R 1,080,000.00 (4 Fellowships)
Total Amount Awarded	R 1,080,000.00 (4 Fellowships)

I wish to express my profound gratitude to all staff of UNISA and iThemba LABS who facilitated our working under a serene atmosphere which, in turn, allowed the Chair and its postgraduates, postdocs and emerging scientists to pursue high quality R&D under the challenging conditions of the Covid pandemic.

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Prof. M. Maaza



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